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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,045	11/18/2003	Andrew M. Sendyk	A894648US	2773

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EXAMINER

PAN, YUWEN

ART UNIT	PAPER NUMBER
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2618

DATE MAILED: 12/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/715,045

Applicant(s)

SENDYK ET AL.

Examiner

Yuwen Pan

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 November 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities: "a", on line 6 after "reuse" should be "the" or "said". By doing so, it is clear that both signals are sharing spectrum. In addition, there should be one period at the end of sentence. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-5, 7, 10, 16-20, 22-25, 29-31, 34 and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by Clark et al ("Clark") (US007006804B1).

Per claim 1, Clark discloses a communication system for simultaneous transmission, reception and restoration of a plurality of individual signals superimposed in space and frequency (see column 1 and line 50-column 2 and line 6), comprising a plurality of collocated transmitter antennas transmitting signals which reuse a common frequency band (see figure 4 and item 130), a plurality of collocated receiver antennas receiving signals which reuse the common frequency band (see figure 4 and item 140, column 2 and lines 40-50), a set of filters,

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having at least one filter, which is used to process the said received or transmitted signals (see figure 2 and item 225), and at least one summing node which sums the signals produced by the said filters restoring at least one original individual signal and reducing the interference resulting from simultaneous transmission of a plurality of signals (see column 5 and lines 5-39).

Same arguments apply, *mutatis mutandis*, to claims 18 and 29.

Per claim 2, Clark further teaches that the separation between the transmitting antennas as well as the separation between the receiving antennas are optimized relative to the distance between the transmitter site and the receiver site so that when, during the restoration of individual signals, the interfering signal is removed, the desired signal is extracted with a constructive superposition (see figure 4 and column 6 and lines 18-42).

Same arguments apply, *mutatis mutandis*, to claim 19.

Per claim 3, Clark further teaches that each individual signal is assigned to a single transmitting antenna and the signal restoration is performed in the receiving system (figure 2, and 4, column 5 and lines 10-55).

Same arguments apply, *mutatis mutandis*, to claim 20.

Per claim 4, Clark further teaches that the signal restoration is performed, on the received signals at the carrier frequency (see column 3 and line 45).

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Per claim 5, Clark further teaches that the received signals are first translated to baseband and the restoration of the signals is performed at baseband (see figure 2, column 5 and lines 10-28).

Per claim 7, Clark further teaches that the attributes of the said set of filters during the pausing of the transmission of on or more of the transmitted signals (see column 8 and lines 52-63, since it is TDD system, the transmitting is on and off).

Same arguments apply, *mutatis mutandis*, to claim 22.

Per claim 10, Clark further teaches that at least one filter is reduced to a phase shifter and amplitude adjustment (see column 5 and lines 29-50).

Per claims 16 and 17, Clark further teaches that diversity means known from the prior art, wherein the diversity means provide for the system's information throughput increase approximately proportional to the diversity order, and the simultaneous transmission of individual signals superimposed in space and frequency provides for an additional information throughput increase approximately proportional to the number of superimposed signals, and processing two orthogonally polarized electromagnetic signals (see column 2 and lines 40-55, column 4 and lines 5-38).

Per claim 23, Clark further teaches that filter response is estimates of the responses of the propagation channel between various combinations of transmitter/receiver antenna (see figure 7 and item 702, column 8 and lines 23-51).

Same arguments apply, *mutatis mutandis*, to claim 32.

Per claim 24, Clark further teaches that channel propagation matrix is defined and subsequently inverted (see column 8 and lines 23-51).

Same arguments apply, *mutatis mutandis*, to claim 30.

Per claim 25, Clark further teaches that set of filter attributes is determined by adaptive techniques (see column 8 and lines 23-51).

Per claim 31, Clark further teaches that at least one of the transmitted signals, canceling the interference at the output of at least one summing node during pauses, using an adaptive algorithm which adapts attributes of the said set of filters (see column 7 and lines 34-56).

Same arguments apply, *mutatis mutandis*, to claims 34 and 36.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6, 8, 9, 11-15, 21, 26- 28, 32, 33, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clark et al ("Clark") (US007006804B1) in view of Dabak et al ("Dabak") (US006594473B1).

Per claim 6, Since Clark discloses a TDD system (see column 8 and lines 52-63) there is no need for close loop control system when the same frequency spectrum is utilized for both uplink and downlink. Thus, Clark doesn't teach utilizing training signals, such as pilot or power control signals for channel estimation and power control. Dabak discloses an open and close loop diversity CDMA system that utilizing pilot signal for estimating channel response (see column 3 and lines 55-60). It would have been obvious to one ordinary skill in the art at the time the invention was made to combine the teaching of Dabak with Clark's system such that while both open and close loop system present in the diversity system, it provides better channel estimation.

Same arguments apply, *mutatis mutandis*, to claim 21, 32, and 35.

Per claim 8, Clark further teaches that filter response is estimates of the responses of the propagation channel between various combinations of transmitter/receiver antenna (see figure 7 and item 702, column 8 and lines 23-51).

Same arguments apply, *mutatis mutandis*, to claim 33.

Per claim 9, Clark further teaches that at least one filter is reduced to a phase shifter and amplitude adjustment (see column 5 and lines 29-50).

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Per claim 11, Dabak further teaches that the attributes of the said set of filters, using a pilot tone signal which is injected alternately into each transmitted signal in a way that does not interfere with the transmitted data signals (see column 3 and lines 55-column 4 and lines 11).

Same arguments apply, *mutatis mutandis*, to claims 26 and 27.

Per claim 12, Dabak further teaches that the attributes of the said set of filters using spread spectrum signals which are overlaid on each of the said set of data signals (see figure 1, column 3 and lines 56-column 4 and lines 11).

Per claim 13, Dabak further teaches that the signals entering the transmitting system are filtered and premixed in the said system so that the restoration process may be accomplished directly by the physical summing of radio waves on the individual receiving antennas (see figure 1 and column 4 and lines 1-11).

Same arguments apply, *mutatis mutandis*, to claim 28.

Per claim 14, Dabak further teaches that a feedback signal from the receiving system to the transmitting system is used to control the signal premixing (see figure 1 and item 2).

Per claim 15, Dabak further teaches that some signal premixing at the transmitter site and some signal restoration at the receive site (see column 4 and lines 1-50).


Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Frecassetti et al (US20030114108A1) and Tsujimoto (US20010004585A1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yuwen Pan whose telephone number is 571-272-7855. The examiner can normally be reached on 8-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anderson D. Matthew can be reached on 571-272-4177. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Yuwen Pan
December 6, 2006